Chapter 1: PERSPECTIVES ON DESIGN RESEARCH

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THE AIM OF THE BOOK

History shows that humans are capable of designing remarkable things: bridges, skyscrapers, dams, cities, the Internet and, less glamorously, sewers and transport systems spring to mind immediately. There are also more subtly extraordinary achievements, including bureaucracies, organizations, IT-systems and processes that allow people to work better together. All of these innovations involve, and are driven by, research. Yet a clear definition of the relationship between design and research is elusive. It is certainly not linear.

The complexity and potential impact of contemporary problems, from societies' difficulty in designing and implementing IT systems, through defining economic policies for the maintenance of welfare ideals, to climate change, cry out for a better understanding of the relationship between design and research. Such understanding may enable designers and their 'users' to conduct research and inform design more effectively. However, again, the relationship between understanding and action is not linear.

One of the reasons is the emergent nature of design. While humans are able to achieve extraordinary things, they are equally capable of producing incredible waste, destruction and injustice. Indeed, extraordinary ambition and destruction often go together, as is illustrated by innumerable examples. A case in point is the car, designed to provide amazing automobility and flexibility for people, based *inter alia* on research into fuel systems, aerodynamics, and driver psychology. Yet, at the same time, cars are now choking our cities and countrysides with air pollution, CO_2 emissions and congestion, contributing to 1.2 million road deaths annually (WHO 2004) and climate change. According to Thackara (2005: 1), '[m]any of the troubling situations in our world are the result of design decisions'. This is, in no small part, because design is producing multiple effects in complex systems with intended but also many unintended consequences. Nevertheless, Thackara is optimistic, seeing design and designers as part of the solution: 'if we can design our way into difficulty, we can design our way out' (ibid.: 1). This is far from simple, of course, since any attempt at design will be appropriated in unanticipated ways, and with unpredictable 'systemic' intended and unintended consequences.

Environmental problems urgently point to a need for new sustainable research-based designs, such as zero energy housing, more sustainable forms of production and consumption, and 'intelligent' technologies for mobility. This must be synchronized with social innovation in everyday practices, with policies and politics (Urry 2008). All such efforts involve and depend on research from many disciplines – from the social sciences and the humanities to the technical and natural sciences. Design decisions mean a lot to how societies change, and there is a widespread expectation that insights

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from research are key to 'good' design decisions and outcomes. However just placing knowledge from research before design is insufficient. Indeed, conceiving research to be separate, if not external to, and prior to design, providing objective and comprehensive insight into contexts for design, to inform design, correctly anticipate, effectively control and shape the future, is misleading. History is full of examples where design based on research has been harmful, sometimes in matters of life and death, such as the failure of the computer-aided despatch system that created chaos for the London Ambulance Service in 1992 (Shapiro 2005). The relationship between design and research is complex, but also promises just and sustainable social transformations. Critical enquiry into this relationship is needed. This is what this book is about.

TYPES OF DESIGN RESEARCH

Most design processes involve very many different actors and perspectives. It is therefore not surprising that a huge diversity of actors talk about doing design but find it difficult to identify shared aspects of their practice. In a co-citation analysis comprising design literature cited within the period of 1990-2000, Atwood et al. (2002) conclude that one of the most cited resources of modern design literature is Herbert Simon's *The Sciences of the Artificial* (1996) in which he describes design as devising 'courses of action aimed at changing existing situations into preferred ones' (p. 111). There are also alternative views on design that are often cited in the literature (as described in Atwood et al. 2002: 126ff.): Christopher Jones (1970), for example, describes design as 'initiating change in man-made things', while Christopher Alexander (1964), who discusses design in architecture, characterizes it as 'the process of inventing physical things which display new physical order, organization, forms, in response to function'. From the point of view of urban planning, Horst Rittel (1984) describes design as 'structuring argumentation to solve "wicked" problems', while Donald Schön (1983, 1987), who studied how designers work and learn, views design as 'a reflective conversation with the materials of a design situation', and Pelle Ehn (1989), representing a Scandinavian approach to Participatory Design describes design as 'a democratic and participatory process'; while Jens Rasmussen et al. (1994) and Kim Vicente (1999), with a background in Cognitive Systems Engineering, characterize design as 'creating complex sociotechnical systems that help workers adapt to the changing and uncertain demands of their job'.

Paradoxically, the influence of research on design and design done by researchers are widespread, but studies on how research works in designing are not. Across different disciplines, this book is in search of a deeper understanding of the relations between design and research. Broadly speaking, we discuss three different types of design-research relations and, building on (Cross 1995, 2006, 2007), we argue that much can be learned from exploring and, in some cases, combining these three perspectives:

- Research *for* design (research-based design).
- Research *into* design (research analysing how design works).
- Research *through* design (design-based research) – which also include design *through* research.